

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

Fig.1

A: Standard SERS B: The COIN Concept

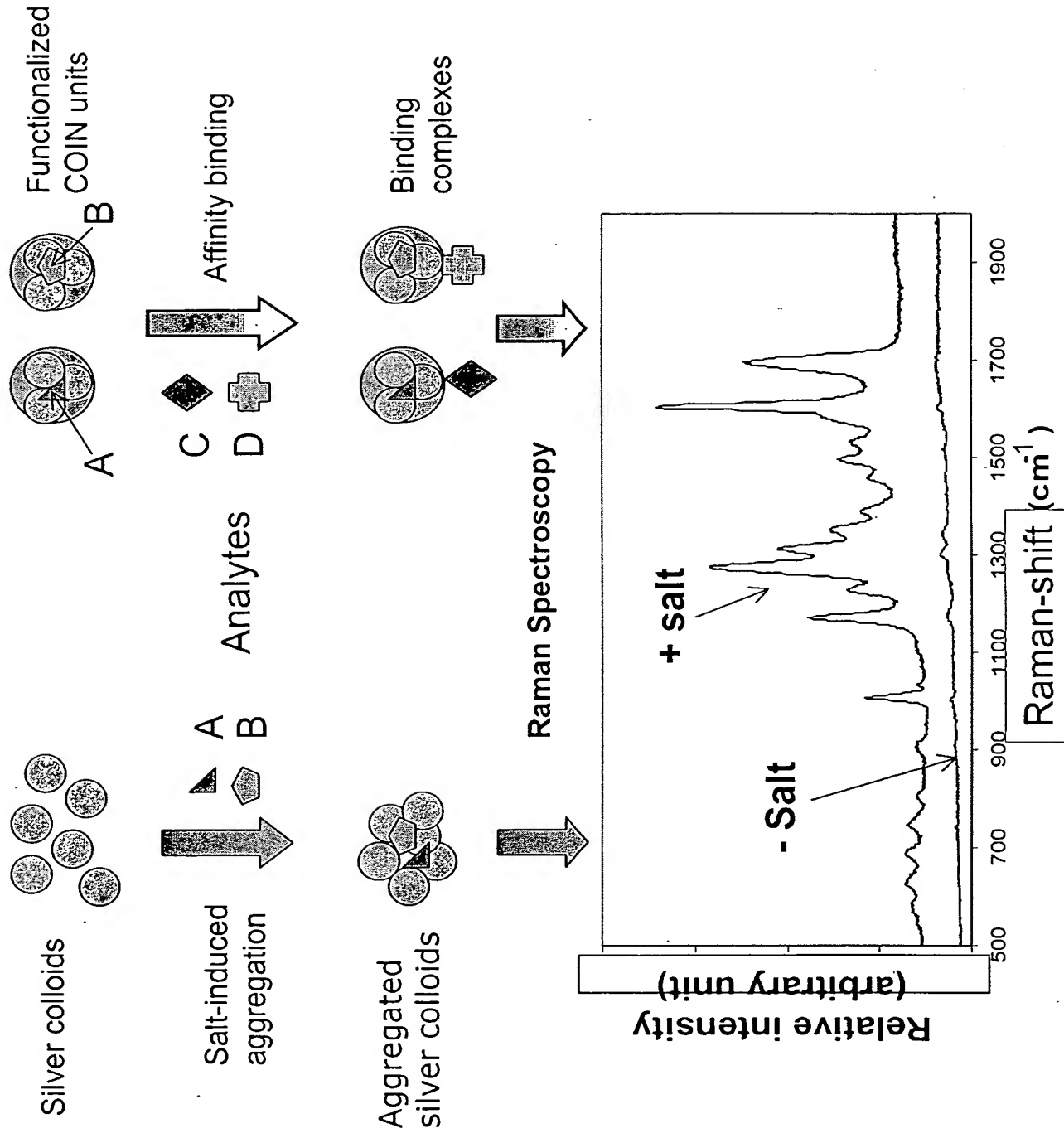


Fig. 2

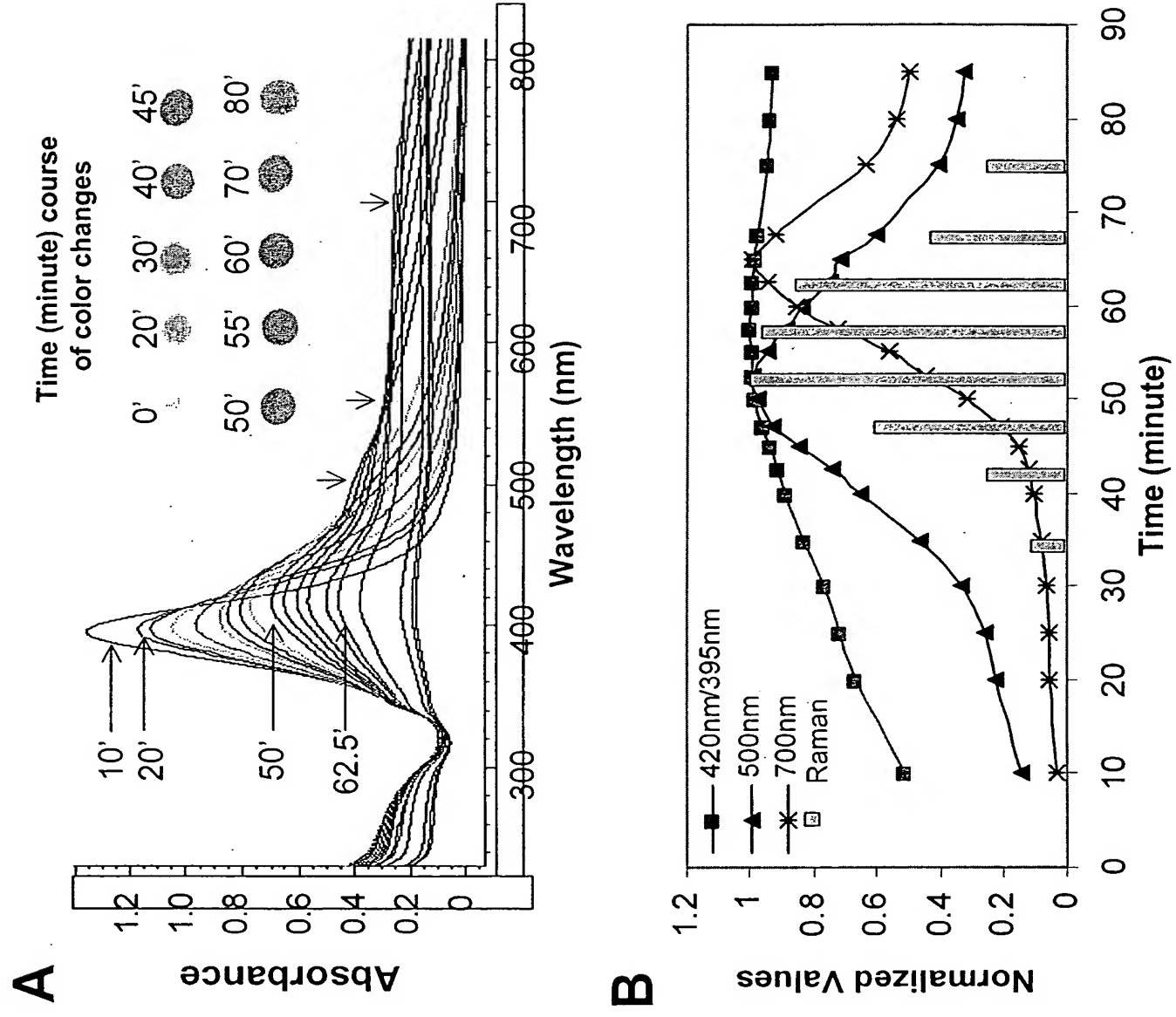


Fig. 3

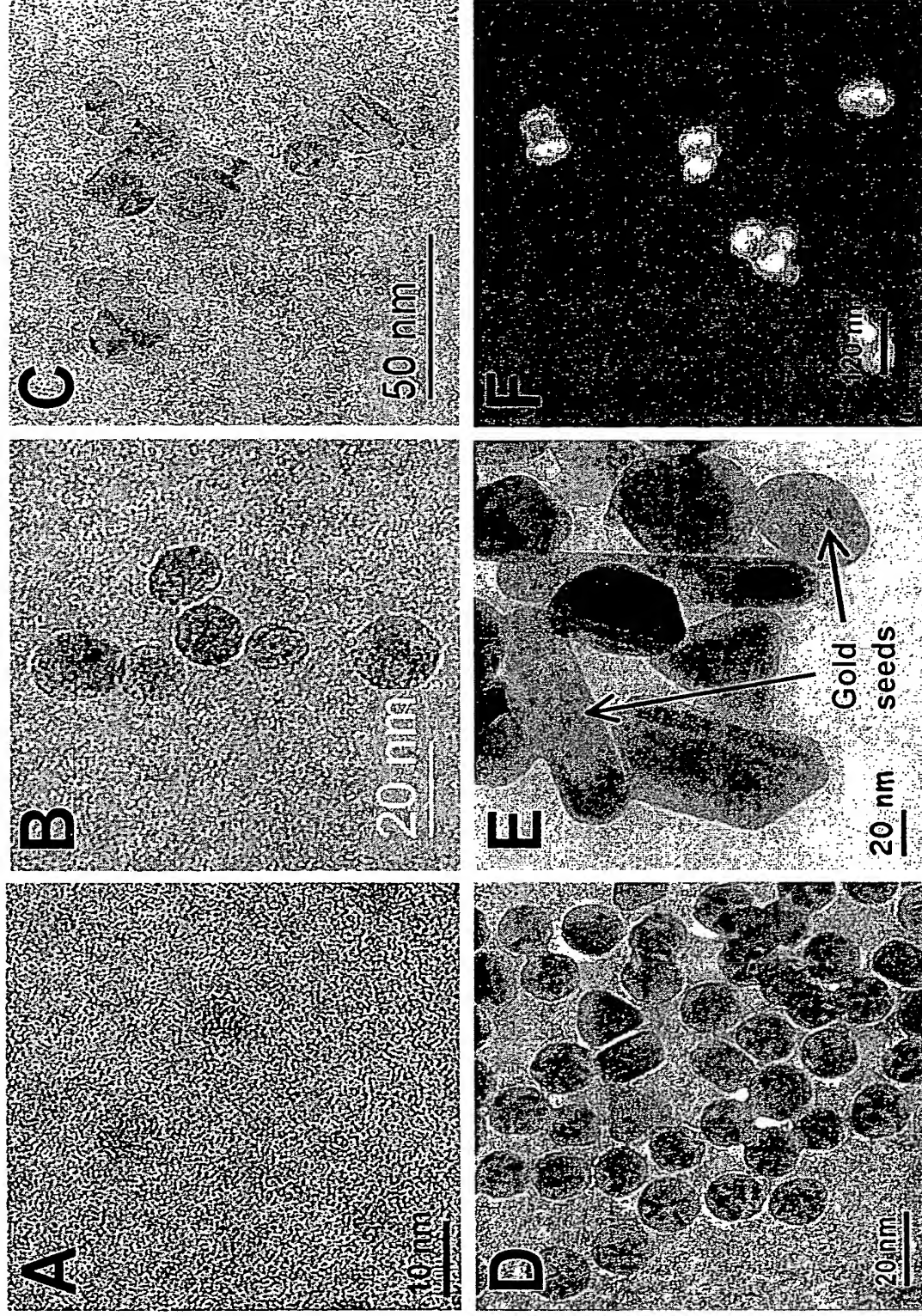


Fig. 4

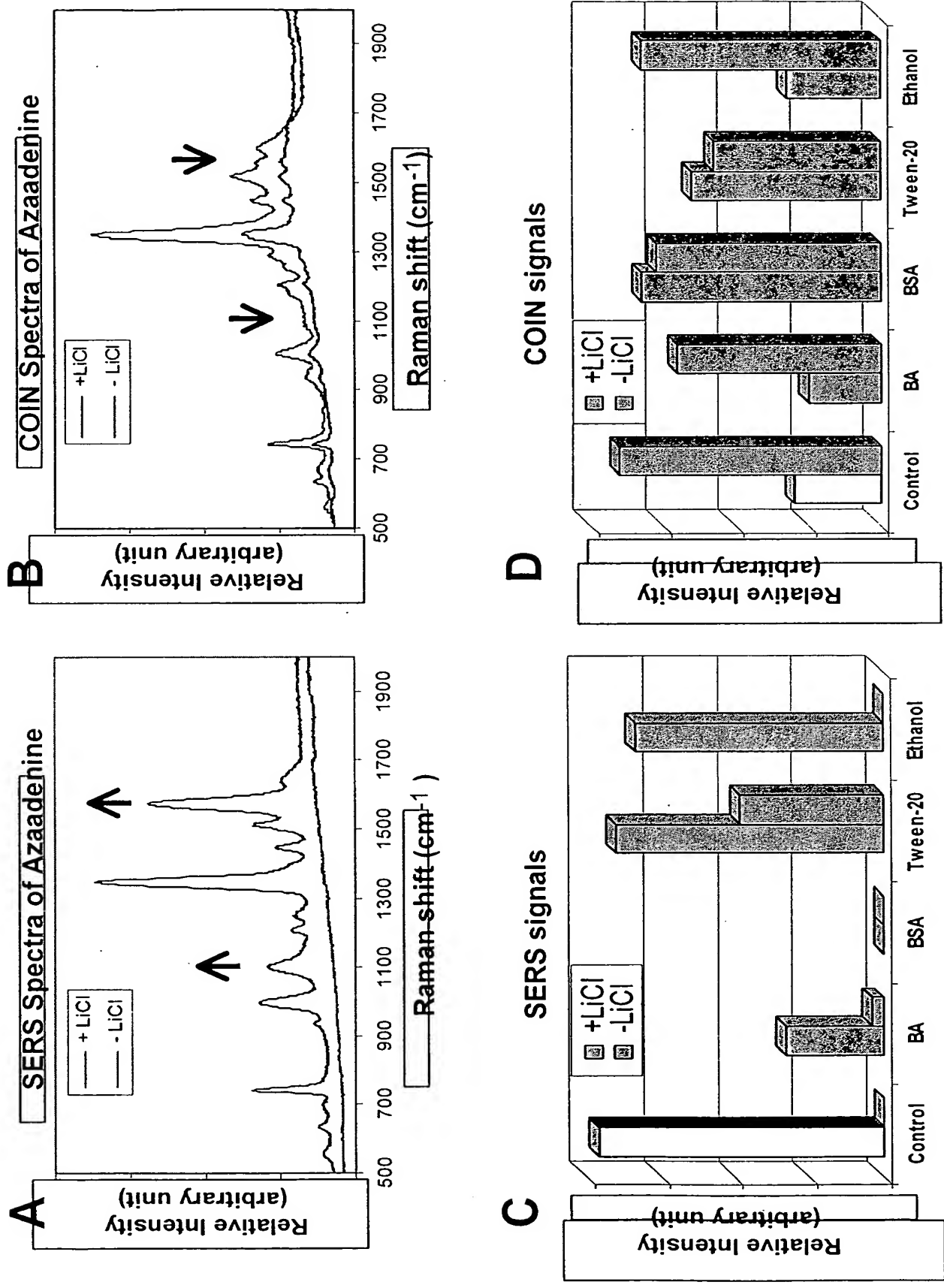


Fig. 5

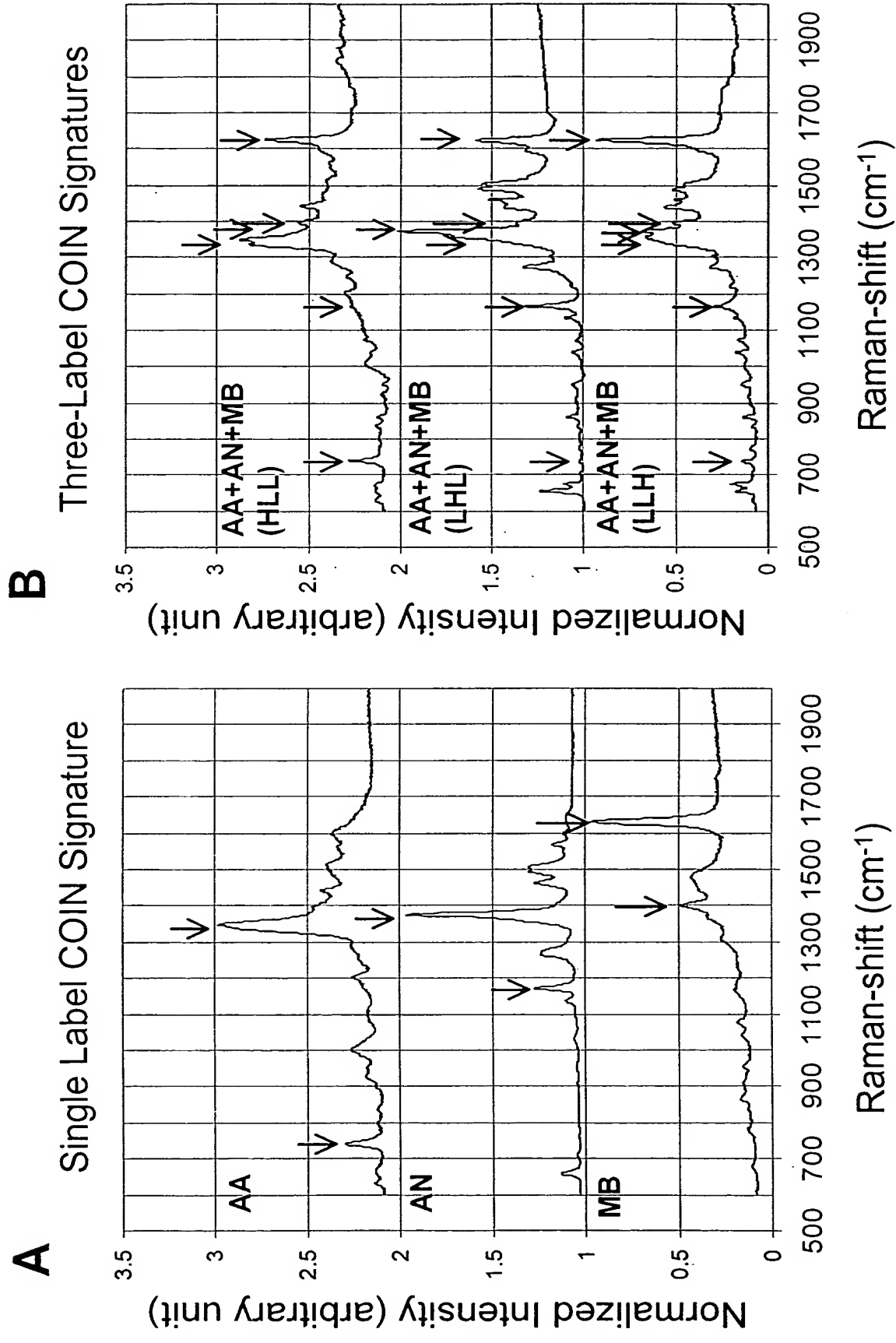


Fig. 6

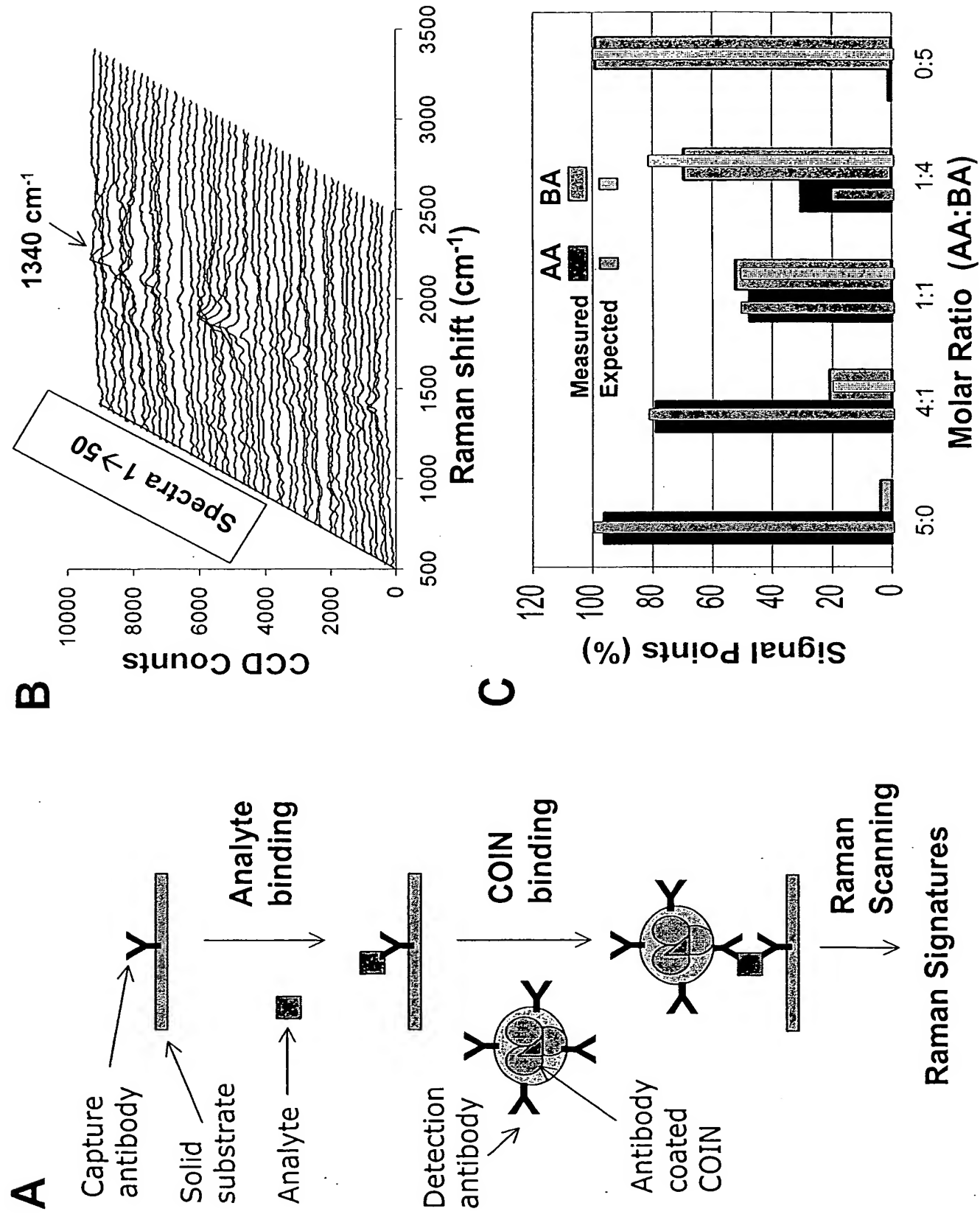
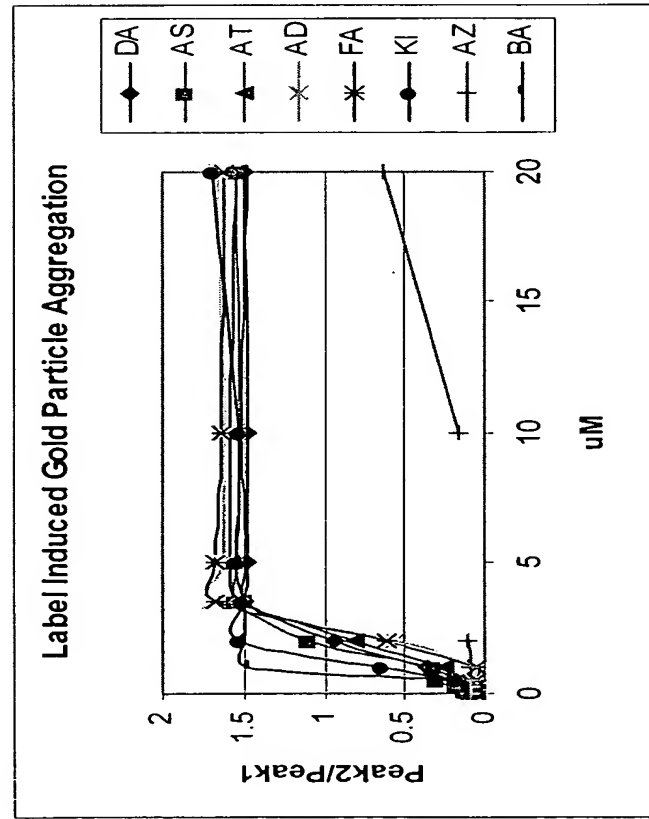


FIG. 7

A



B

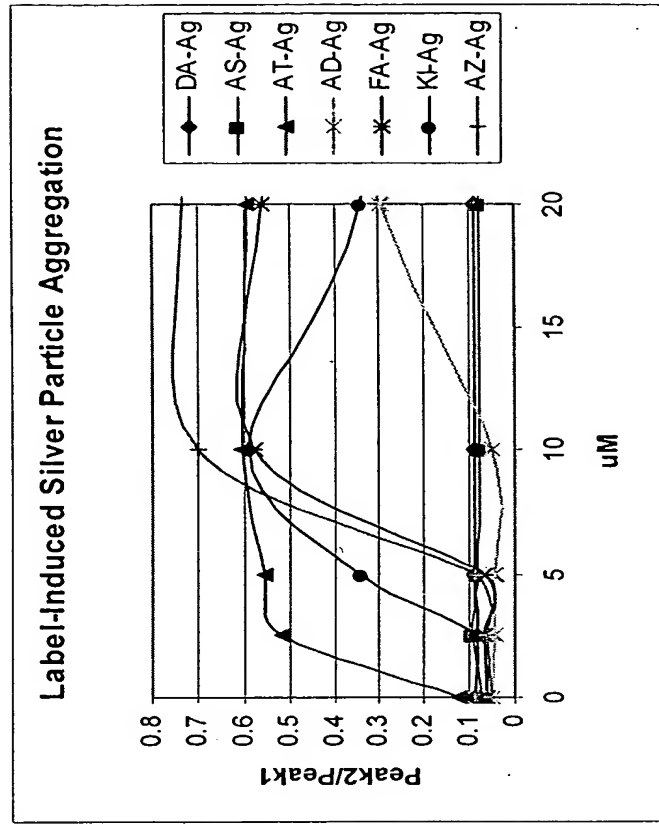


FIG. 8

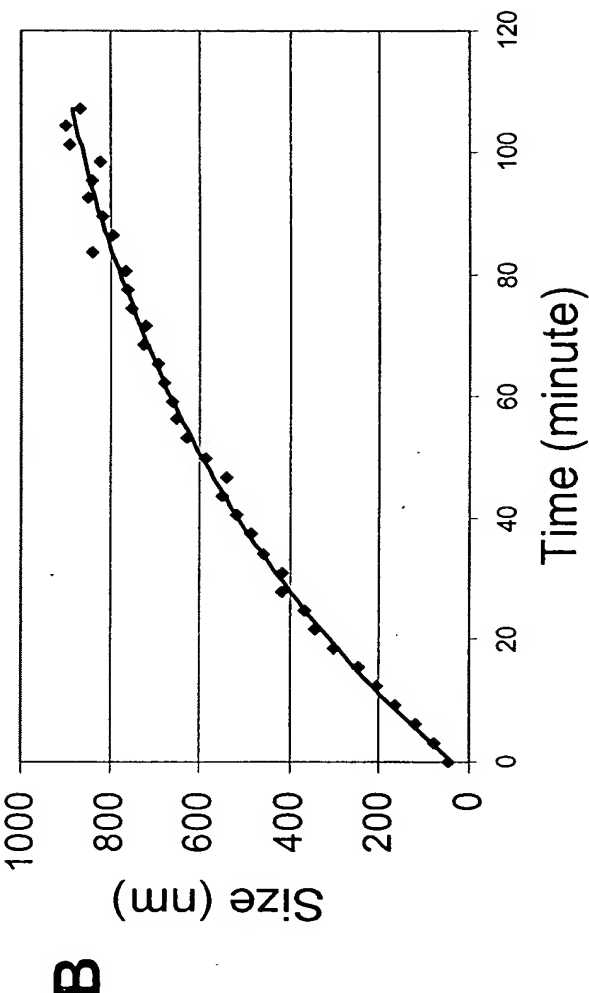
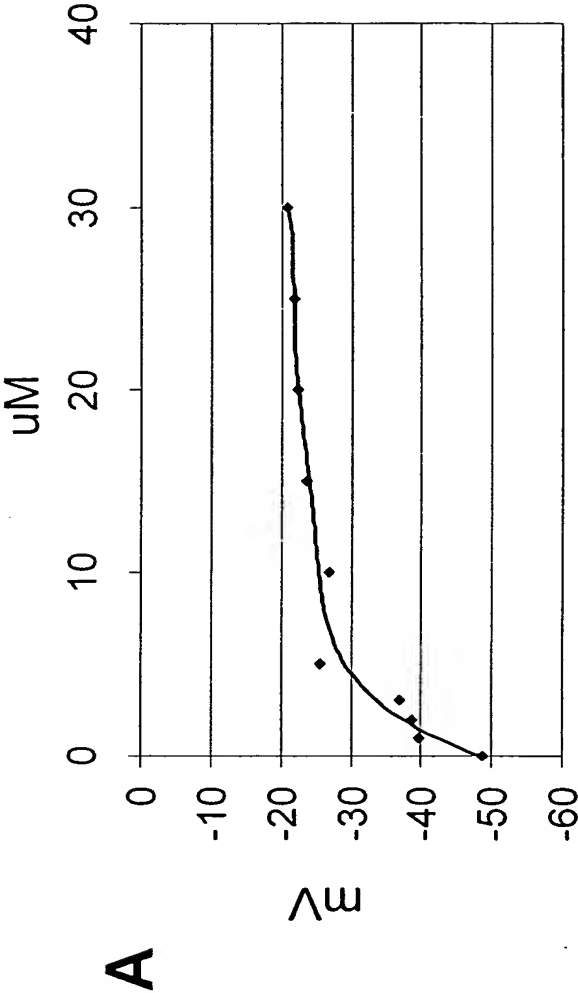


FIG. 9

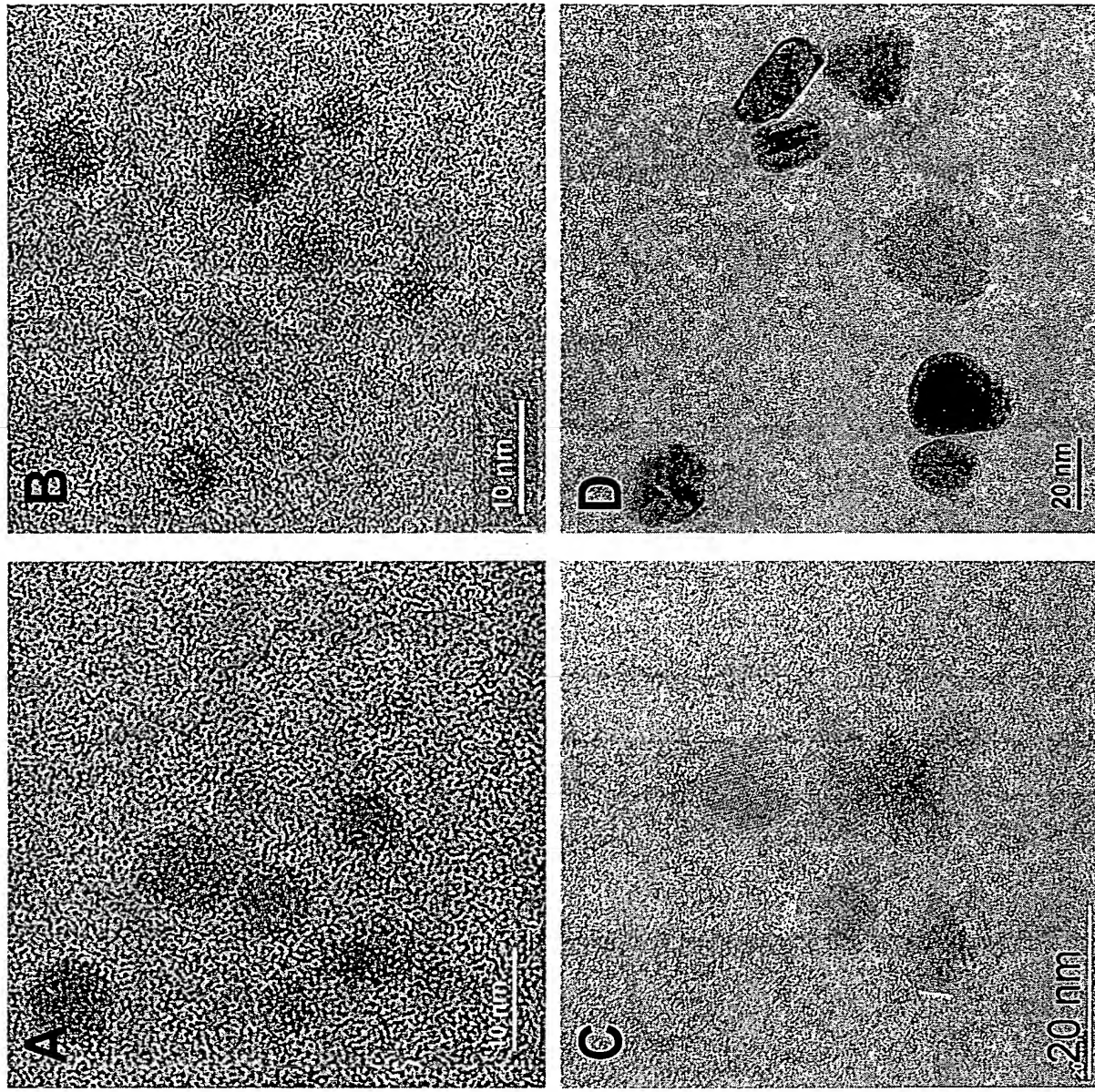


FIG. 10A

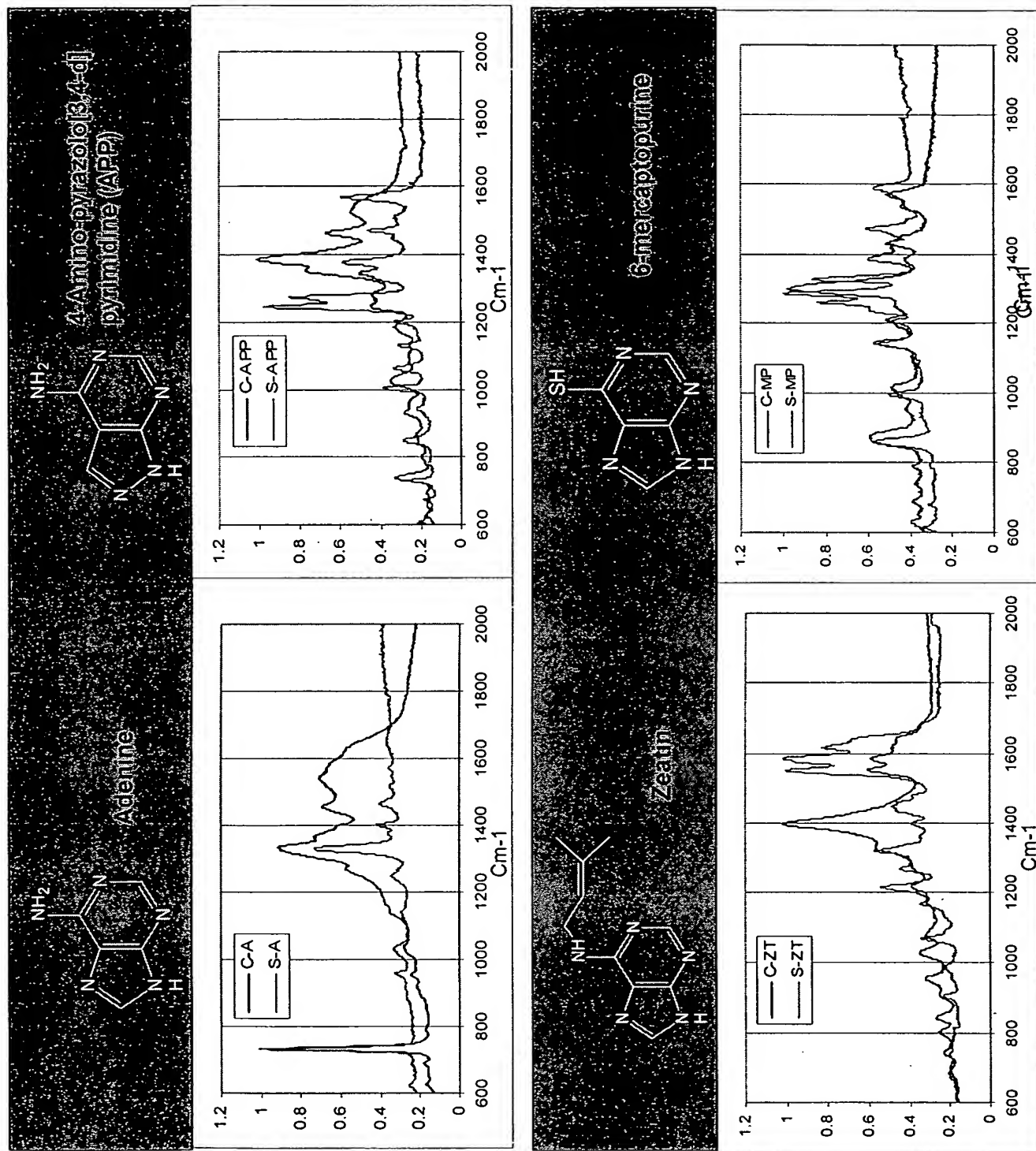


FIG. 10B

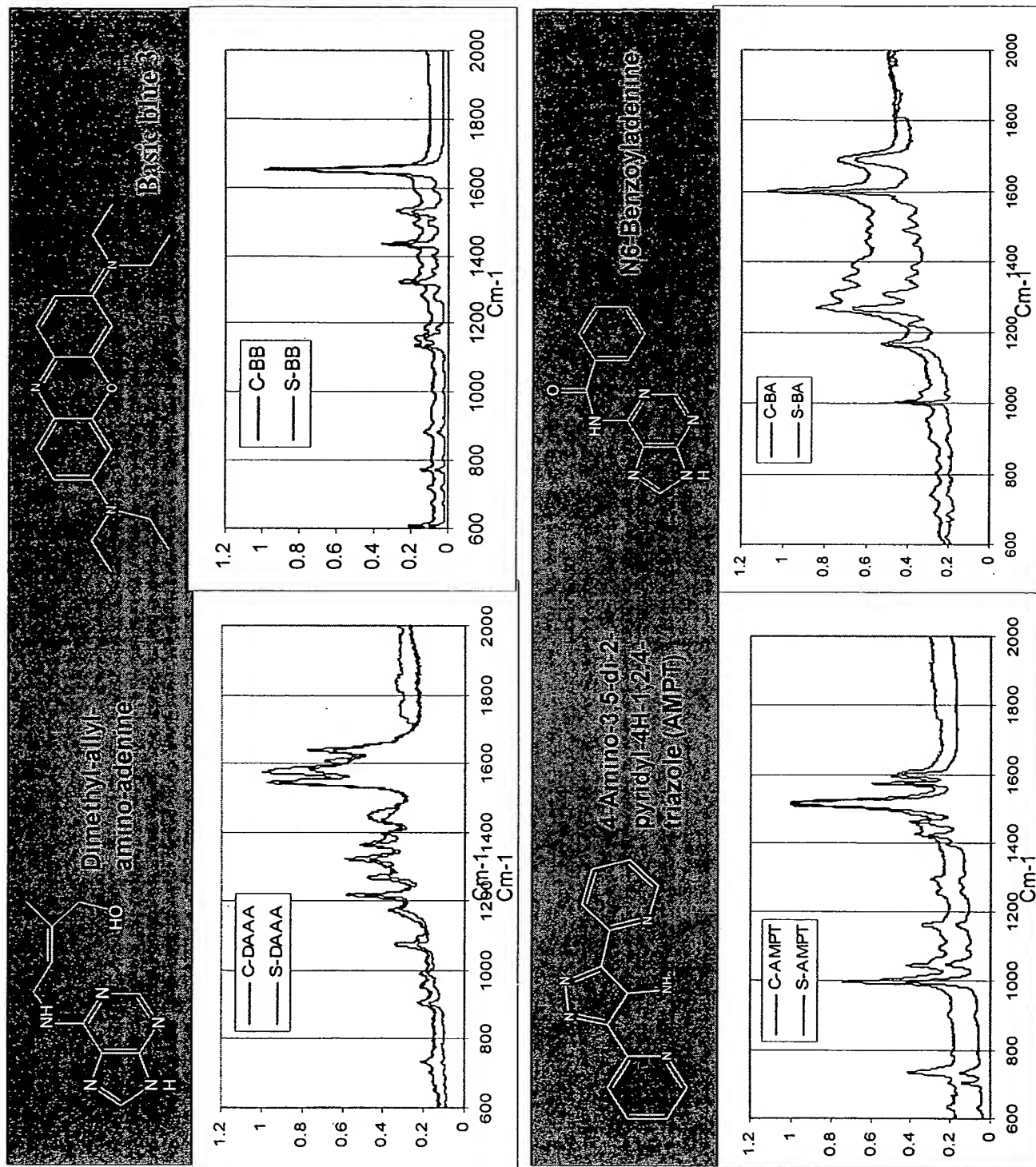


FIG. 11A

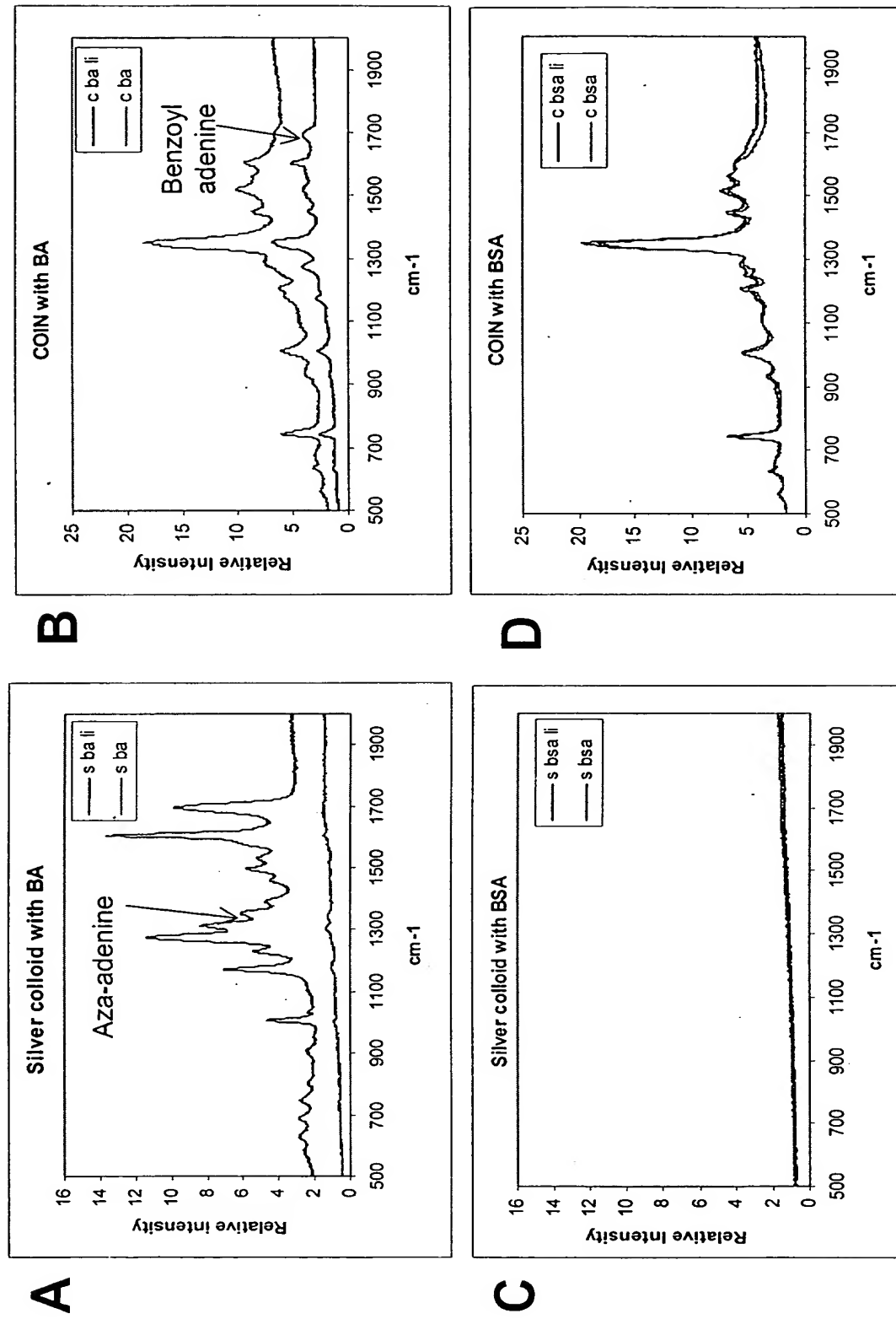


FIG. 11B

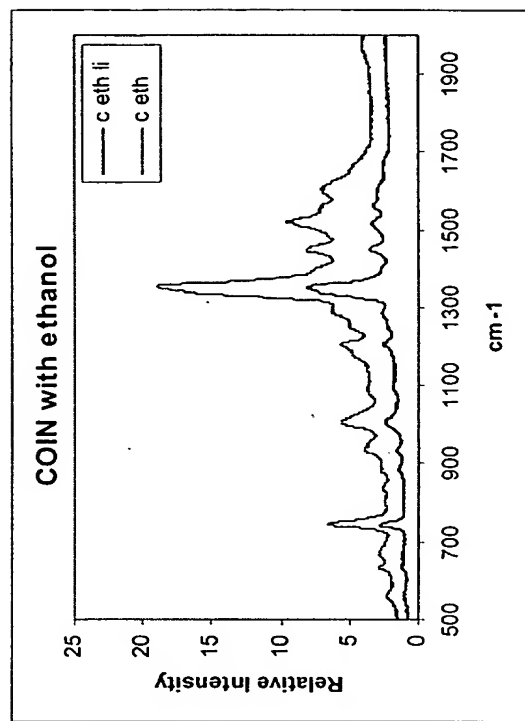
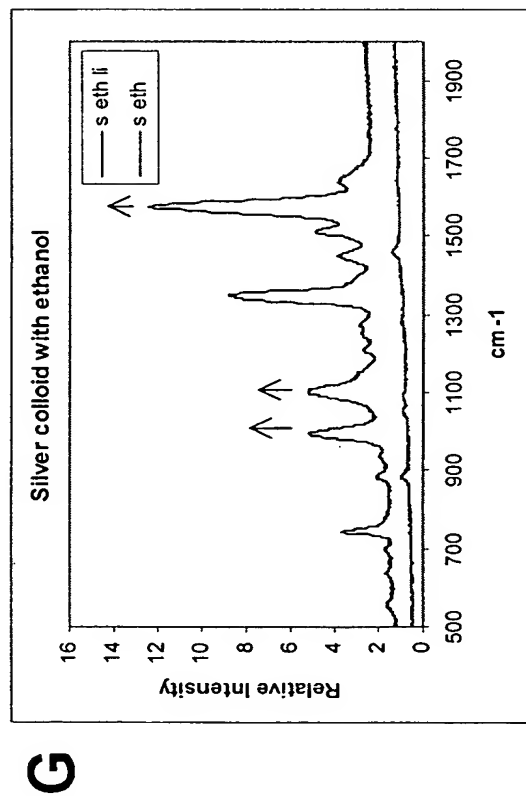
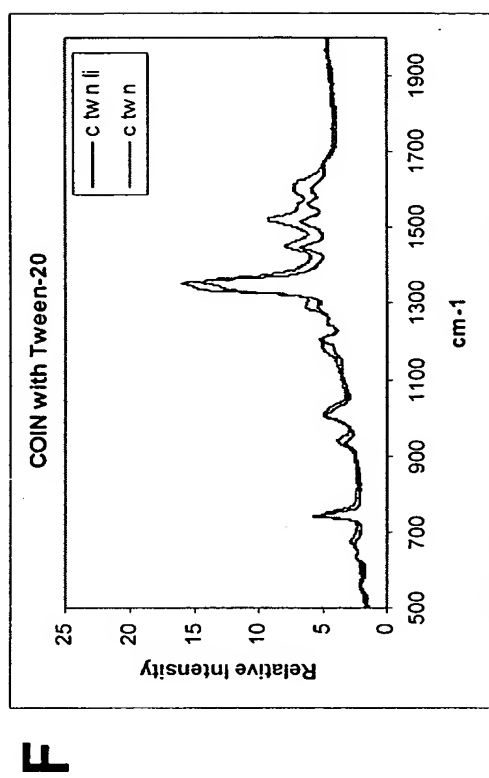
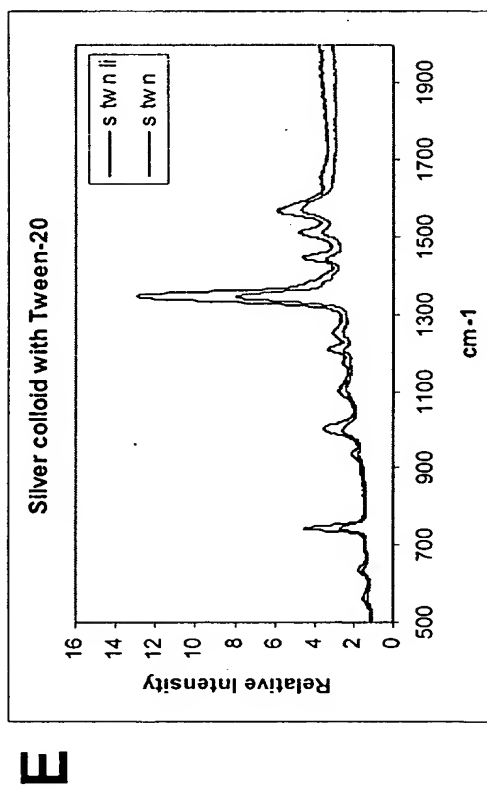


FIG. 12

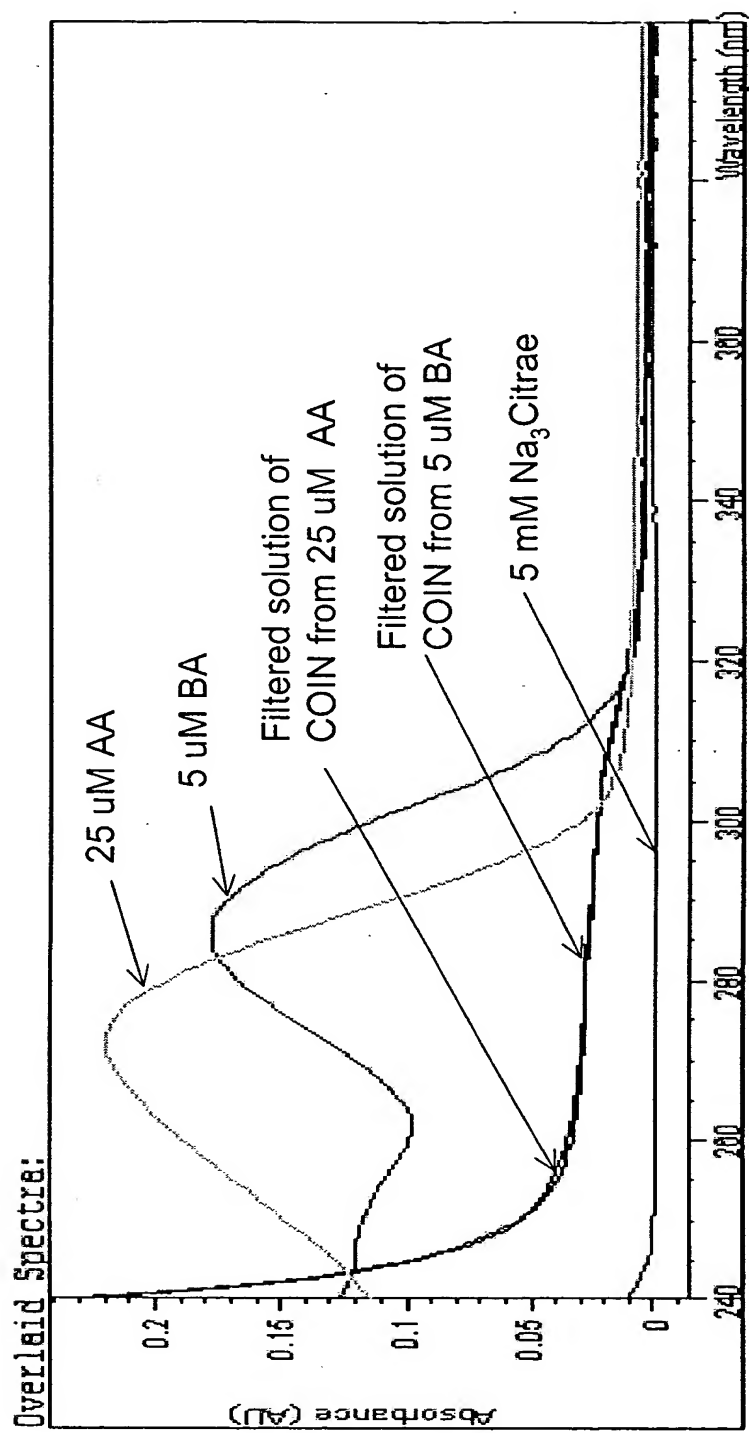
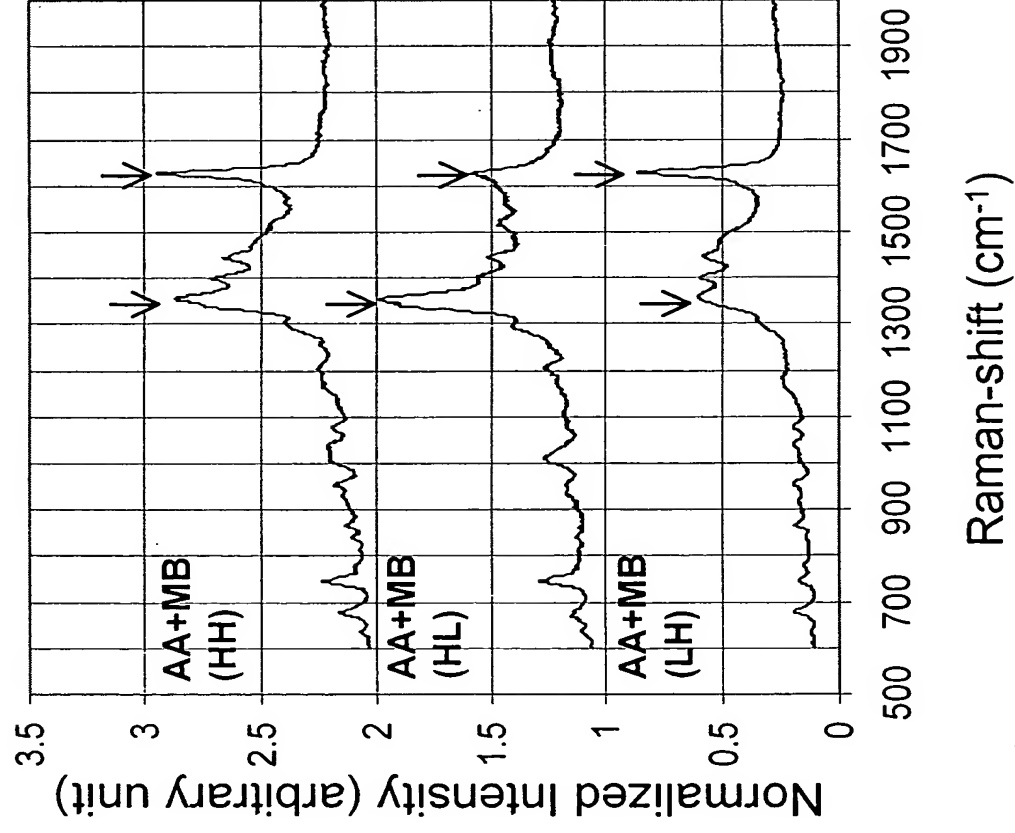


FIG. 13

A

Two-Label COIN Signatures



B

Three-Label COIN signatures

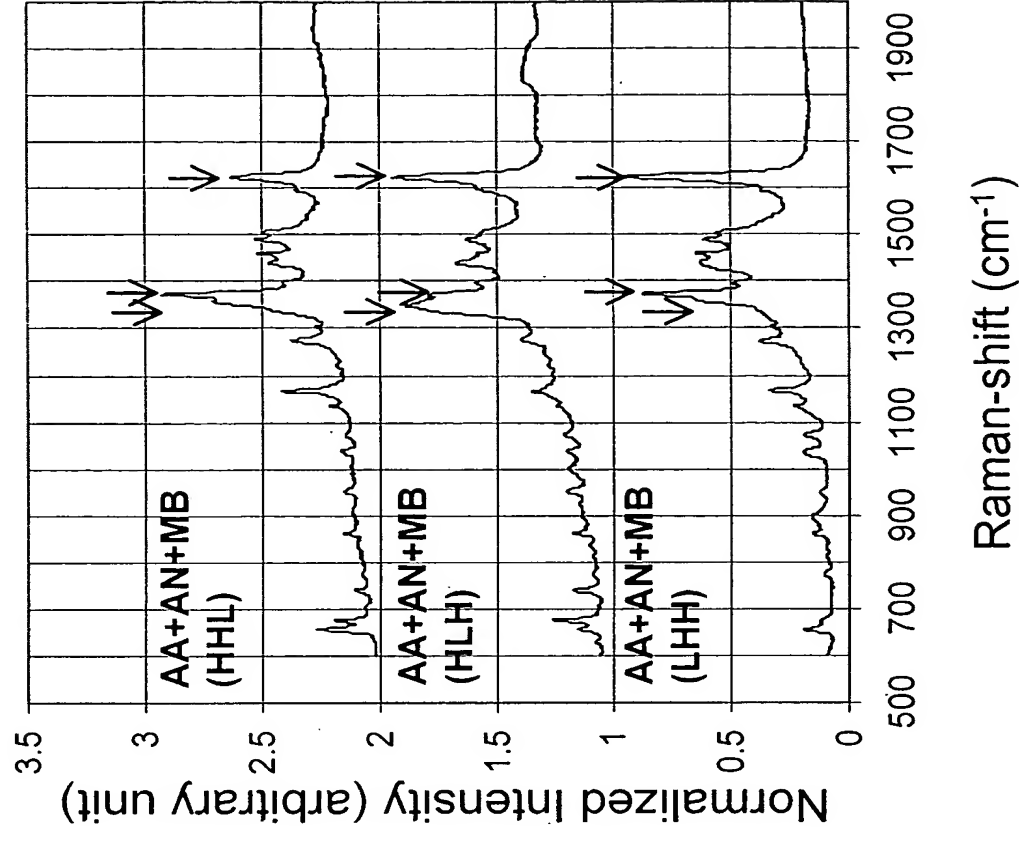
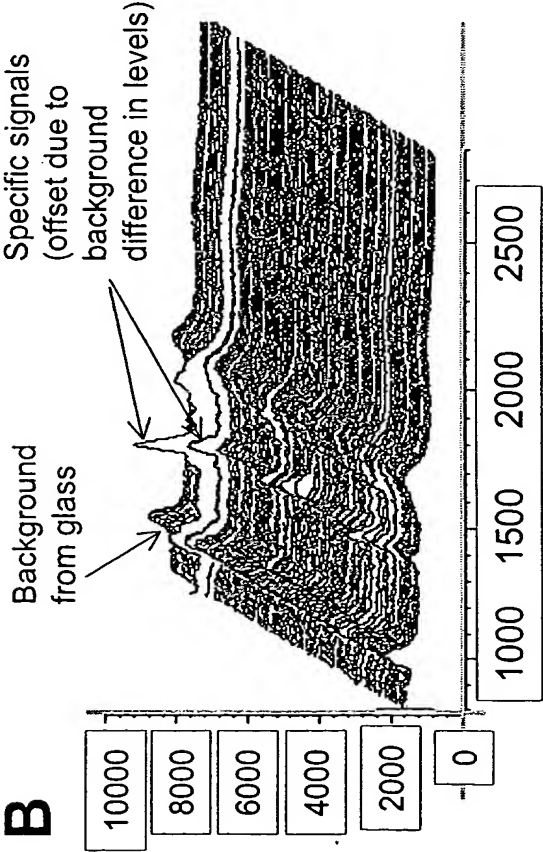
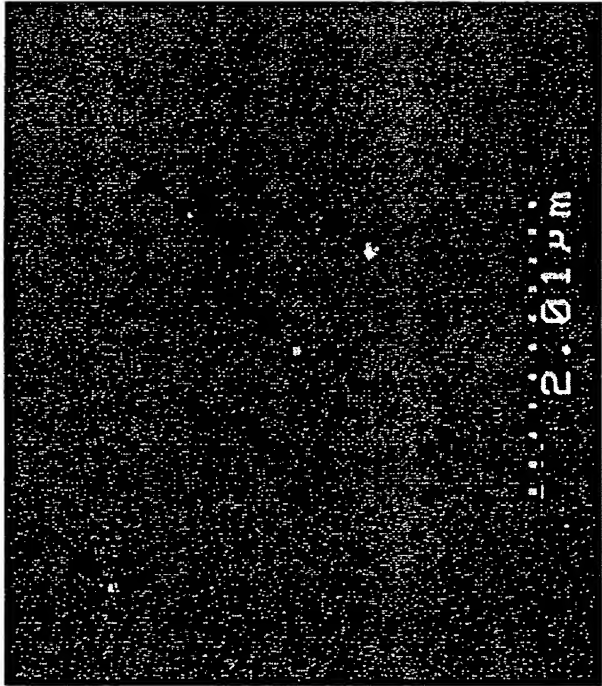


FIG. 14



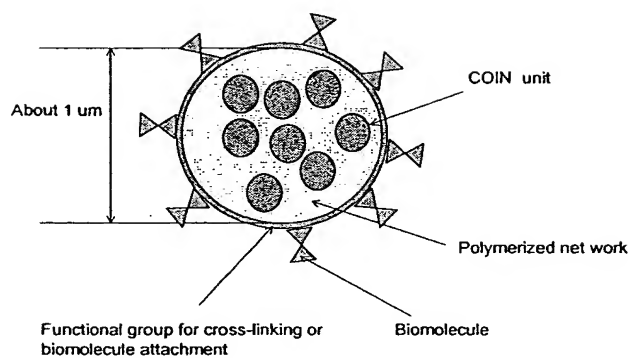
C

	Scanning electronic microscopic (SEM) image	Raman Scanning
Total images or spectra	40 images, 50 uM ² /image	500 spectra, each covering 12 uM ²
Total analyzed area (uM ²)	2000	6000
Positive spectra or signal points (>50 uM for SEM)	280	259
Signal point per uM ²	0.14	0.043
% Raman-active /SEM particles		30%

Table S1: Tested Organic Compounds

Organic Compound	Abbreviation	Molecular weight	Main Raman Shift Peak from COIN
Colorless			
2-Aminopurine	AP	135.1	797 cm^{-1}
2-Fluoroadenine	FA	153.1	1387 cm^{-1}
4-Amino-pyrazolo[3,4-d]pyrimidine	APP	135.1	1345 cm^{-1}
4-Pyridinecarboxaldehyde	PCA	122.1	Not detected
8-Azaadenine	AA	136.1	1340 cm^{-1}
Adenine	A	135.1	730 cm^{-1}
4-Amino-3,5-di-2-pyridyl-4H-1,2,4-triazole	AMPT	238.2	1513 cm^{-1}
6-(γ , γ -Dimethylallylamino)purine	DAAP	203.2	1575 cm^{-1} , 1549 cm^{-1}
Kinetin	KN	215.2	1531 cm^{-1}
N6-Benzoyladenine	BA	239.2	1600 cm^{-1}
Zeatin	ZT	219.2	1317 cm^{-1}
Colored			
4-Amino-2,1,3-benzothiadiazole	ABT	151.2	Not detected
Acridine	AF	259.7	1565 cm^{-1}
Basic blue 3	BB	360.9	1649 cm^{-1}
Methylene Blue	MB	319.9	1630 cm^{-1}
Thiol			
2-Mercapto-benzimidazole	MBI	150.2	1270 cm^{-1}
4-Amino-6-mercaptopyrazolo[3,4-d]pyrimidine	AMPP	167.2	1370 cm^{-1}
6-Mercaptopurine	MP	152.2	1296 cm^{-1}
8-Mercptoadenine (adenine thiol)	AT	167	1331 cm^{-1}
Fluorescent			
9-Aminoacridine	AN	248.7	1375 cm^{-1}
Cyanine dyes	Cy3	466	High background (514nm laser)
Ethidium bromide	Ebr	394.3	High background (514nm laser)
Fluorescein	FAM	332.3	High background (514nm laser)
Rhodamine Green	R110	380.8	High background (514nm laser)
Rhodamine-6G	R6G	479	High background (514nm laser)

FIG. 16



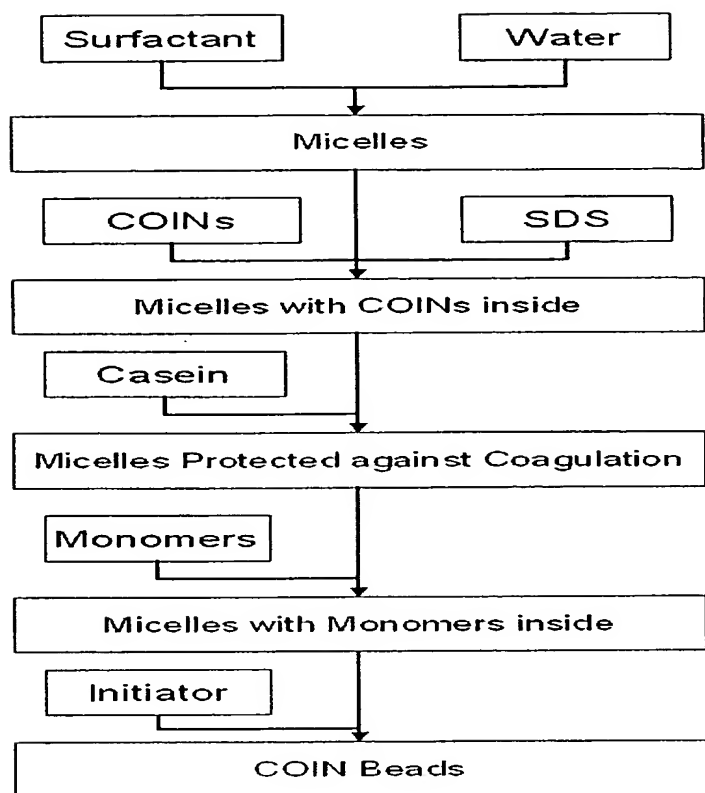


Figure 17

Soak-in method

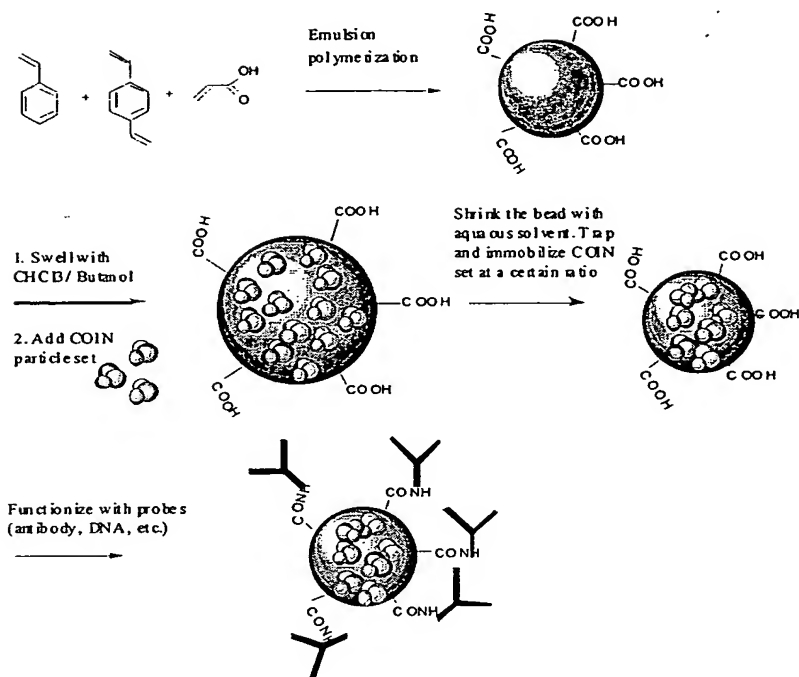
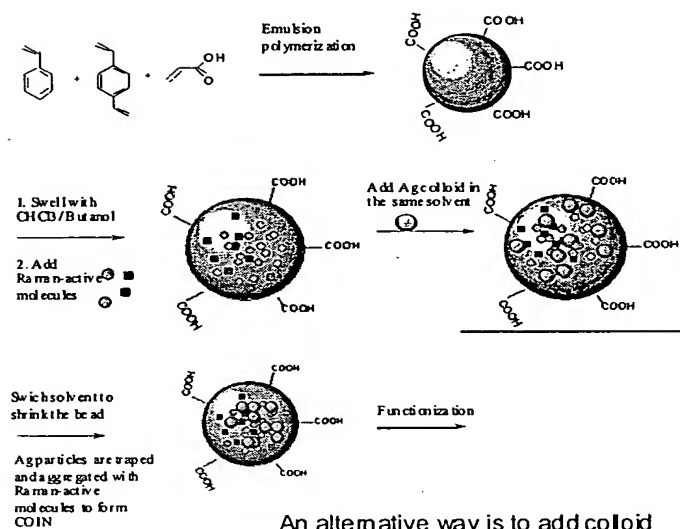


Figure 18

Build-in Method



An alternative way is to add colloid first and then add Raman labels

Figure 19

Build-out Method

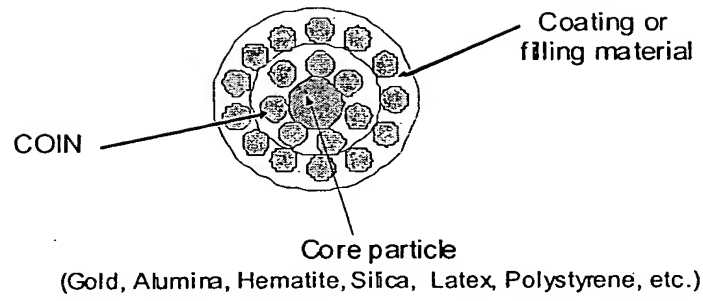


Figure 20